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Meeting time: Scheduled laboratory 1:10–5:10 PM. Our initial meetings will be in the chemistry conference room.

Office hours: Stop by my office as needed or feel free to make an appointment. Plus, I'll be with you every week.

Course description: This is an inorganic laboratory. Rather than a traditional laboratory experience, you will target and attempt to address a current problem in inorganic chemistry. It will require more thought and intellectual input that a traditional laboratory course, but the benefits are great. Minimally, you may discover something interesting and publishable.

The course requires that we engage in some planning and experimental design, make what we need, run our experiments, and analyze the data. If this is to be a useful activity, we need to have at least two iterations.

Learning goals: The overall goal of this course is to leverage prior laboratory experience and classroom knowledge to address research questions in inorganic chemistry. The specific goals of this class map heavily on to the learning goals for a degree in chemistry at UVM

1. Identify (or design) and execute the synthesis of simple metal compounds.
2. Find information in and evaluate the chemical literature.
3. Determine the composition and purity of metal compounds using spectroscopic and analytical techniques.
4. Plan and execute a catalytic reaction.
5. Analyze appropriate data to determine catalyst activity.
6. Communicate results in written and oral form.

In this laboratory, you will map out a plan to address a current problem in inorganic chemistry. The course will provide background (and refresher) information about inorganic chemistry, spectroscopy, and other necessary areas, but it is critical that you read both what is provides and look for more relevant information in the chemical literature.

Making rationally deigned plans, executing these plans, and then evaluating their efficacy is core competency to any job in any field. This is an upper-level lab; more than demonstrating a concept from inorganic chemistry, we are using inorganic chemistry to allow you to design, tinker, think, and explore.

Safety: This is an experimental laboratory—safety in this environment is of paramount importance. Each student will complete a contract that outlines the key safety responsibilities of the course and student.

Course outline: This is not a traditional laboratory course. I am not providing you with a set of pre-deigned experiments. At the first class, we will define the problem and scope of our investigation. I have provide several references to frame that discussion. Please read these before our first meeting.

3. Results. This section answers what did you do, what happened, and how do you know that?
4. Discussion. In the literature, this is sometimes combined with results but not here. The discussion section will examine what you learned about the reaction, what features of the catalysts matter, and how your work related to the knowledge in the literature. This is the most complex section of your report.
5. Conclusions. A summary of what you learned and where your study can go next, which is critical for the mid-semester report!
6. Experimental detail. The exact procedures and data is presented here.
7. References.

Report are the product of individual work and writing, but collaboration in the intellectual process is strongly encouraged.

Presentations: The entire CHEM 295 lab class is a single team working on our problem. In that way, it is essential that we share data and discuss results. To facilitate that engagement, each group will present their data and lead a discussion on the implications of their results. The presentations will last approximately 15 minutes and summarize design plan, results, and interpretation (i.e., report content). The team will lead a discussion. A critical part of the presentation is that all team members share the presenting work.

After the formal presentation is complete, the team will field questions and pose discussion questions to the group for approximately five minutes thereafter.

Grading: Your performance in this course will depend on five factors:
1) Lab notebooks & lab performance (10%).
2) Compound plans (2 x 10%)
3) Reports (2 x 15%)
4) Presentations (2 x 15%)
5) Survey completion (2 x 5%)

You'll notice that I did not mention "survey completion" above. I am collaborating with Grinnell investigators to learn about how this experience impacts your learning. Please complete the pre-survey and the final survey as provided. While I will not know your individual results, I know if these are completed (or not) and can compensate appropriately!

Missing any due date will result in a 5% penalty *against your course grade* for any item handed in late. A 5% penalty is a little more than a third of a letter grade (e.g., A to A–). You can *trash* you grade by missing deadlines for the course because there will be six. Does this sound a little hardcore? Well, it is, and for good reason. These materials are steps in your process. Plus, it is benevolent self-interest; I want you to do well—because I will be there with you.

All items are due in class (at 1:10 pm) unless otherwise noted.

The following schedule has a basic flow: There is initial content we need to cover and planning that you (and we) need to do to be successful.

Course Schedule

Date	**Event**	**Location**
8/31	First meeting: course logistics & semester plan, safety, selected topic overview, and talking about our feelings	Conference room
9/7	Second meeting: Compound plans due. Discussion of compounds and plans for catalysis.	Conference room
	NMR tutorial (2:00–3:00 pm)	NMR laboratory
	Electrochemistry tutorial	A-218
9/14	Laboratory 1-1: Synthesis of ligands and compounds.	A-105
9/21	Laboratory 1-2: Synthesis cont'd and start characterization.	A-105
9/28	Laboratory 1-3:	